NRF REVIEW: ATTACHMENT R2

Autoreg Procedure

Dependent Variable = DIFF

Ordinary Least Squares Estimates

SSE	361.901	DFE	30
MSE	12.06337	Root MSE	3.473236
SBC	183.17	AIC	178.6804
Reg Rsq	0.0760	Total Rsq	0.0760
Durbin-Watson	1.9198		

Variable	DF	B Value	Std Error	t Ratio	Approx Prob
Intercept	1	0.28046800	0.4946	0.288	0.7750
D84	1	2.98710000	1.9704	1.570	0.1268
D89	1	0.42210000	1.9704	0.226	0.8230

Preliminary MSE = 2.600547

Estimates of the Autoregressive Parameters

Lag	Coefficient	Std Error	t Ratio
1	0.[illegible]	0.[illegible]	0.211415
2	0.[illegible]	0.[illegible]	1.130158
3	0.[illegible]	0.[illegible]	0.578817
4	0.[illegible]	0.[illegible]	0.488347
5	0.[illegible]	0.[illegible]	0.946880
6	0.[illegible]	0.[illegible]	2.075776

NRF REVIEW: ATTACHMENT #2

Yule-Walker Estimates

SSE	248.0162	DFE	24
MSE	10.37308	Root MSE	3.22113
SBC	193.0873	AIC	179.5987
Reg Rsq	0.1083	Total Rsq	0.3642
Durbin-Watson	2.084		

Variable	DF	B Value	Std Error	t Ratio	Approx Prob
Intercept	1	0.23968873	0.3564	0.673	0.5076
D84	1	1.72446828	1.4882	1.159	0.2580
D89	1	1.22681341	1.5777	0.778	0.4444

NRF REVIEW: ATTACHMENT R3

Autoreg Procedure

Dependent Variable = DIFF

Ordinary Least Squares Estimates

SSE	251.5197	DFE	28
MSE	[illegible]	Root MSE	2.99714
SBC	[illegible]	AIC	170.6734
Reg Rsq	[illegible]	Total Rsq	0.3578
Durbin-Watson	[illegible]		

Variable	DF	B Value	Std Error	t Ratio	Approx Prob
Intercept	1	[illegible]	0.7730	0.526	[illegible]
D75	1	[illegible]	1.5477	0.538	0.5945
D80	1	[illegible]	1.5477	[illegible]	0.1193
D85	1	[illegible]	1.5477	2.779	[illegible]
D90	1	[illegible]	[illegible]	[illegible]	0.2549

Preliminary MSE = [illegible]

Estimates of the Autoregressive Parameters

Lag	Coefficient	Std Error	t Ratio
1	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]

NRP REVIEW: ATTACHMENT B3

Yule-Walker Estimates

SSE	142.82	DFE	22
MSE	6.491818	Root MSE	2.547905
SBC	181.965	AIC	165.4935
Reg Rsq	0.5868	Total Rsq	0.6353
Durbin-Watson	2.0055		

Autoreg Procedure

Variable	DF	B Value	Std Error	t Ratio	Approx Prob
Intercept	1	0.45273638	0.3088	1.466	0.1570
D75	1	0.70679795	0.8109	0.869	0.3942
D80	1	-2.69777964	0.7798	-3.460	0.0014
D85	1	3.94821142	0.8305	4.751	0.0001
D90	1	-1.30615378	1.2430	-1.051	0.3048

PREPARED TESTIMONY

OF

DR. RICHARD L. SCHMALENSEE

BEFORE THE

PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

ON BEHALF OF

PACIFIC BELL

INVESTIGATION NO. 95-05-047

SEPTEMBER 8, 1995

PREPARED TESTIMONY OF DR. RICHARD L. SCHMALENSEE

Q. Please state your name, business address, and professional qualifications.

A. My name is Richard L. Schmalensee. I am presently the Gordon Y Billard Professor of Economics at Massachusetts Institute of Technology ("MIT") and Special Consultant to National Economic Research Associates, Inc. My business address is One Main Street, Cambridge, Massachusetts. I received my S.B. and Ph.D. degrees from MIT and have taught at the University of California at San Diego. I have authored numerous articles in the field of industrial organization and am the co-editor of the *Handbook of Industrial Organization*. From 1989 to 1991, I was the Member of the President's Council of Economic Advisors concerned with domestic and regulatory policy. I am the founding editor of the MIT Press monograph series *Regulation of Economic Activity* and a member of the Executive Committee of the American Economic Association. My research and teaching have been largely concerned with government regulation of business and are described in Attachment 2.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide the economic rationale for the changes in the form of regulation for Pacific Bell which Pacific Bell has recommended. A major focus of my work at the Council of Economic Advisors was an effort to streamline the regulatory process. I believe that business and society as a whole can benefit immensely when economic regulation is simple, predictable and grounded in sound economic principles. These goals are met in the Pacific Bell proposal. My analysis is presented in the study entitled, "Incentive Regulation and

Competition: Issues for the 1995 Incentive Regulation Review." A copy of the study is Attachment 1 to this testimony.

Q. Does this conclude your prepared testimony?

A. Yes, it does.

PREPARED TESTIMONY

OF

DR. RICHARD L. SCHMALENSEE

ATTACHMENT 1

INCENTIVE REGULATION AND COMPETITION:

ISSUES FOR THE 1995 INCENTIVE REGULATION REVIEW

INCENTIVE REGULATION AND COMPETITION:

ISSUES FOR THE 1995 INCENTIVE REGULATION REVIEW

Prepared for Pacific Bell

by

Richard L. Schmalensee, Timothy J. Tardiff and William E. Taylor

National Economic Research Associates
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September 8, 1995

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SUMMARY: PACIFIC'S PROPOSAL TO ELIMINATE THE PRICE CAP FORMULA IS ECONOMICALLY SOUND

Phase I of I.95-05-047 poses the following question of fundamental economic importance: Should GDP-PI minus X (inflation minus productivity factor) in the price cap formula be modified or eliminated? The question is clearly timely, in light of the large changes in California's telecommunication industry that continue to unfold. Pacific's proposal to eliminate the price cap formula is an economically sound response to both the Commission's question and to the changing competitive environment in California.

Pacific's plan would substitute targeted price protection in the form of the requirement that the Commission approve price changes for all Category I services (including basic access for residential and small business customers) for the current across-the-board application of the price cap formula. This change would have a number of economic benefits. First, the proposal would let the marketplace, rather than regulation, work for services for which competition will provide price protection and other benefits such as increased innovation.[1] Second, customers would receive price protection in the form of stable prices for the service for which competition will be less effective in the near future. Third, eliminating the formula also eliminates the economically inefficient practice of price reductions for those Category I services that are already below cost. Reducing below-cost prices not only distorts consumer choices, it can also inhibit the development of efficient local exchange competition.

Pacific's proposal has two additional features. First, in addition to the distortions produced by across-the-board price reductions in general, the magnitude of the reductions produced by the

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[1] Professor Harris's testimony documents extensive competition for intraLATA toll services and other Category II services. Robert G. Harris, Competition in California Telecommunications Markets. (September 8, 1995 "Harris") In addition, under Pacific's proposal, the Commission maintains control over the ceiling and floor prices for Category II services.

current productivity factor is too large. Modifying the formula with a reasonable productivity target no higher than the national average of about two percent would permit prices to increase if inflation forecasts of over three percent come true. Thus, Pacific has assumed the risk of high inflation with its proposal for stable prices. Second, the current plan produces overall price reductions that exceed the productivity target when competition drives prices below their ceiling—in effect the formula and competition produce a double hit on Pacific's prices. Pacific's targeted price protection proposal remedies this problem.

I. INTRODUCTION

The last decade of the twentieth century has been a period of rapid change in telecommunications, both world-wide and in California. At the beginning of the decade, the large majority of intraLATA services were provided by regulated monopoly providers—the local exchange carriers (LECs)—and regulation had just changed from traditional cost-of-service regulation to various forms of inventive regulation. Effective January 1, 1995, the Commission authorized competition for intraLATA interexchange services, with the interexchange carriers responding rapidly and vigorously to the new opportunities.[2] During 1996, the Commission expects to eliminate all legal barriers to entry by authorizing open competition in all markets, including local exchange services.

The movement toward increased competition in telecommunications requires a commensurate change in regulatory treatment that takes into account the structural changes in the industry. Just as the extent of competition defines a continuum from monopoly supply to open competition, the regulatory spectrum ranges from strict regulation to eventual deregulation of large segments of the industry. As the level of competition changes, a corresponding change in regulatory treatment is necessary. That is, in order for such competition to benefit California's consumers, the regulatory regime must be compatible with the state of competition. Just as the Commission correctly recognized in 1989 that traditional regulation, which had for the most part served California and the nation well for a number of decades, needed to be changed to respond to incipient competition, it must be recognized that a change of a similar magnitude is necessary to accommodate its objective of opening all markets to competition.

The Commission initially established the incentive regulation plan for Pacific and GTEC on October 12, 1989 (D.89-10-031). On June 1994, D.94-06-011 changed certain parameters of the incentive regulation plan. By design, the review that produced these changes focused on "mid-course corrections" and for the most part avoided major changes in the rationale or structure of

[2] Harris, op cit.

incentive regulation. Therefore, left in place was an ambitious productivity target (which was actually increased from 4.5 percent to 5.0 percent) that had been established (1) for an industry where the LECs maintained authorized monopoly status over the bulk of their services and (2) at a time when the California LEC industry was sustaining growth far surpassing the national average.

Clearly, times and conditions have changed dramatically from the time when incentive regulation began in California. Fortunately, the Commission has ordered a second review of incentive regulation to be undertaken this year. And as D.94-06-011 recognized, the 1995 review must produce a plan that responds to the rapidly changing competitive environment: "Through an OII, early on the Commission can engage parties in the necessary examination of those rapidly changing issues that are integral to the framework and the future."[3] In this spirit, we respectfully submit that major changes to the framework must be made to respond to a world in which market forces will replace regulation as the primary determinant of how telecommunications services are provided. At the same time, we recognize that some services in some areas are less likely to face vigorous competition in the near term. Customers of these services should continue to be protected by regulatory safeguards, such as Commission approval of price changes, monitoring, lifeline rates for qualifying customers, and so forth.

Phase I of this investigation seeks answers to three questions.

1. Should GDP-PI minus X (inflation minus productivity factor) in the price cap formula be modified or eliminated?

2. Should the price cap formula be applied to all above the line services or Category I services alone?

3. Should implementation of regulatory modifications be ordered in stages, contingent on achieving milestones?

The answer to these questions, especially the first, provides the opportunity to align incentive regulation more closely with the state of competition in California's telecommunications markets. In particular, proper answers to these questions will align incentive regulation with

[3]D.94-06-011, p. 123.

current competitive conditions (1) by providing reasonable price protection (2) by appropriate focus on services to the extent they require price protection. Eliminating the GDP-PI minus X formula allows the marketplace to control prices and bring consumer benefits where practicable. However, given the requirement that no Category I price can be adjusted absent specific Commission approval, there remains in place a fundamental safeguard to ensure that consumers are protected.

The beginning of authorized intraLATA toll competition will soon be followed by local exchange competition on January 1, 1996 when the Commission's interim rules take effect. This rapid change from little authorized competition less than one year ago to vigorous and growing competition makes this second review of incentive regulation critical both in terms of outcome and timing. The terms and conditions that emerge from the review, starting with the resolution of the three questions to be addressed in Phase I, must allow the LECs the opportunity to be vigorous, financially healthy competitors. In addition, Phase II of this investigation will provide the opportunity to address other important issues, including the elimination of the last vestiges of rate of return regulation (sharing and the like) that are still in place in the current plan. Thus, the necessity of updating incentive regulation for 1996 and beyond (because the current plan has not been definitively extended beyond this year) is at the same time an opportunity to craft a coordinated package of competition policies, universal service funding reforms, and improvements to incentive regulation that will serve California's telecommunications industry and its consumers during the last few years of this century.

II. ECONOMIC EFFICIENCY, COMPETITION, AND EFFECTIVE REGULATION: THE CHANGING TELECOMMUNICATIONS INDUSTRY REQUIRES CHANGES IN INCENTIVE REGULATION

D.89-10-031 established eight regulatory goals, with economic efficiency prominent among them. Of course, the need to establish regulatory goals in the first place arose from the fact that, unlike the case for most goods and services, competition was not strong enough to produce the outcomes that competitive markets deliver—lower prices, customer choice, innovative products and services, and the like. Accordingly, although these goals remain valid in today's competitive

environment, the means of attaining the goals must change as competitive conditions change. In fact, attainment of the goals will be provided for the most part by competition itself, with targeted regulatory intervention. Regulation will no longer be completely able to determine the prices of services nor target particular price reductions to specific customer types. Like most goods and services produced in the United States, these outcomes will be produced by the market, not by regulatory fiat.

It is useful to view the world of traditional regulated monopoly supply and the end state of open competition in all markets as the end points of a continuum. In order to effect economically efficient outcomes along this continuum, any required regulation must be tailored to the competitive conditions at hand and must adapt to likely near-term changes in those conditions. The correct regulatory treatment is relatively well-understood at the ends of the continuum. In his classic textbook, Professor Kahn has succinctly stated the economic goal of regulation when monopoly supply is complete: "[T]he single most widely accepted rule for the regulated industries is regulate them in such a way as to produce the same results as would be produced by effective competition if it were feasible."[4] The corollary to this widely accepted rule—that competition should replace regulation where it is feasible—is cogently described by Baumol and Sidak:

> Our least surprising conclusion is that, wherever they can be relied upon to do the job, market forces are preferable to governmental intervention. Whenever competition has become sufficiently powerful to protect legitimate interests of both consumers and related firms, the local telephone company should be granted full freedom from regulation, subject only to surveillance by the regulatory agency to confirm that market forces are operating as expected and have not eroded.[5]

The economic prescription for a mix of competition and regulation is much more difficult. In fact, Professor Kahn has warned that: "recent experience clearly suggests...that the mixed

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[4]Alfred E. Kahn, *The Economics of Regulation*, Cambridge: The MIT Press, 1988, Vol I, p. 17.

[5]William J. Baumol and J. Gregory Sidak, *Toward Competition in Local Telephony*, Cambridge: The MIT Press, 1994, pp. 4-5.

system [competition and regulation] may be the worst of both possible worlds."[6] The fundamental problem lies in the fact that the success of competition is measured by many performance criteria and that regulation may focus on one of these criteria to the detriment of other more important ones. For example, traditional cost-plus regulation, which is universally recognized as obsolete for telecommunications regulation, focuses almost exclusively on the profit level of the regulated firm. While this focus was an attempt to emulate one outcome of competitive markets—firms on average earn only normal profits, it did so at the expense of other competitive outcomes (e.g., competitive firms have incentives to minimize their cost, given the price constraints competition imposes). The current plan initiated in 1990 improved regulation by giving firms better cost-minimizing incentives, but until this year, it operated with the bulk of Pacific's services still classified as regulated monopoly (Category I).

Just as traditional regulation focused on a limited array of competitive outcomes, California's incentive regulation plan attempted to emulate competition by providing consumers with productivity benefits similar to those automatically provided by competitive forces.[7] However, providing all services with the average benefits produced by the productivity target ignores the fact that in competitive markets, prices respond to both cost and demand conditions. There are no guaranteed productivity dividends for particular services and/or consumers. Further, attempts by regulators to provide such out-of-date guarantees in the face of competition can do considerable harm. To the extent that such attempts at control restrict only the LECs, these providers are handicapped relative to their rivals. For example, the current price cap rule requires uniform reductions in the real prices (or price ceilings) of all regulated services, irrespective of their underlying costs and/or market conditions. This, in turn, restricts the LECs' price flexibility relative to that of its competitors. Similarly, the LECs' inability to offer interLATA services means

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[6]Kahn, op. cit., p. xxxv. In particular, Kahn lists a number of problems with the mixed system that distort competition, including cost averaging and obligations-to-serve.

[7]In fact, the current productivity target includes a "stretch" component that requires Pacific to reduce prices to a level consistent with practically twice historical average U.S. telecommunications industry productivity.

that, unlike the competitors they will face when local competition begins, they cannot be "full-service" telecommunications providers.

Therefore, unlike the beginning of price cap regulation, where the focus was on a better way to provide incentives for efficiency and to control the market power possessed by the LECs in most markets, the current amount of competition in major markets, which is ever-increasing, requires a more precisely targeted application of regulatory intervention.[8] The emergence of strong competition in these markets means that the real thing replaces regulation that, at best, can only emulate the workings of competition.

Specifically, we endorse Professor Kahn's prescription of how regulation should evolve in the face of growing competition. The rules are few and simple: (1) efficient entry requires that prices be efficient, i.e., rates be rebalanced to eliminate subsidies and/or competitively neutral universal service funding mechanisms be in place;[9] (2) open entry demands deregulation of the incumbent's services that are no longer monopoly-provided; (3) price protection must be provided for essential services not yet subject to widespread competition, e.g., basic residential access; and (4) inputs essential for competition must be available on a non-discriminatory basis and competing LEC retail services must pass an imputation test (requirements already provided for, and being met by Pacific, in D.89-10-031 and D.94-09-065).[10] This form of regulation would provide the benefits of competition to California's consumers, with the market providing the price protection and efficiency incentives that used to be provided by the current form of regulation. The existing regulatory safeguards, such as monitoring, Commission approval for price changes, and the availability of lifeline service and meeting the established imputation requirements provide the

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[8]D.89-10-031, at page 173, states that price cap regulation relies on market forces, rather than regulatory forces to promote efficiency. A more precise characterization is that the regulatory force of the price cap produces efficiency incentives that approximate those of competition. With competition, the price discipline comes from the market, not from a regulatory-imposed price cap.

[9] This issue is being addressed in the parallel universal service funding investigation.

[10]See, for example, Kahn, op. cit., Vol I, p. xxxvi and Alfred E. Kahn, "Review of Regulatory Framework: Telecom Public Notice CRTC 92-78," Evidence submitted to the Canadian Radio-television and Telecommunications Commission on behalf of AGT Limited, April 13, 1993.

necessary control over the incumbent LEC's ever-shrinking ability to charge supra competitive prices, thus providing the necessary protection both to consumers and to the competitive process.

We note that market forces may be much less predictable than regulation. That is, as competition replaces regulation as the driving force in telecommunications, regulators may not be able to control outcomes as well as they have in the more stable and predictable world of regulation.[11] For example, regulators have been able to define and uniformly price basic residential service. With the onset of local exchange competition, the regulator's control could be redirected to defining minimum standards and establishing targeted subsidy mechanisms. As telephony, video, and wireless technologies converge, integrated packages of services may emerge as the preferred market alternative. In such an environment, regulators might choose to designate today's basic service offering as a minimum standard that is available to all, with the market itself defining and providing the package(s) of services that have wide appeal. Similarly, regulators have had some ability to target productivity gains, e.g., by setting prices and/or requiring uniform price reductions for Category I services and Category II pricing ceilings. In contrast, in more competitive markets, the market itself distributes overall productivity gains consistent with the underlying cost and demand conditions, which typically means that some services will have greater price reductions than others. For example, while airline deregulation has brought enormous gains in the form of lower prices, some prices (e.g., restricted tickets targeted to vacation travelers) are much lower than others (unrestricted tickets used by business travelers).

In summary, the facts that major California markets are open and experiencing vigorous competition and more markets will open in the next few months indicate that we have progressed well beyond the regulated monopoly end of the regulation-competition continuum. Prices, service offerings, and other outcomes seen in a competitive markets, should not, and indeed cannot be controlled by regulation. In order to meet the Commission's economic efficiency goal and to provide LECs the proper incentives and opportunities in an environment of growing competition,

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[11]For example, in its Infrastructure Report, the Commission quite rightly refrains from dictating specific technologies for telecommunications networks.

the next major step is to target regulatory price protection to where it is needed, while letting competition do its job in all other situations.

III. SHORTCOMINGS OF CURRENT PLAN IN A COMPETITIVE ENVIRONMENT

The current incentive regulation plan requires large, sustained price reductions that are unrealistic in the competitive environment that continues to emerge in California[12]. Under this plan, Pacific has exceeded the national average in productivity gains,[13] while at the same time its earnings-growth has lagged behind the national average. Competition will exacerbate this unbalanced situation. In the next section, we evaluate Pacific's plan to correct this fundamental problem. In particular, in response to Phase I of this investigation, the focus is on reform to current method of price protection (replacing the formula) that provides realistic price protection for the current and emerging competitive environment.

The intention of the current price cap approach is to provide productivity incentives that emulate those of competitive markets. The regime under which the plan had operated was one in which the bulk of intraLATA telecommunications services offered by the LEC was assigned to the monopoly category.[14] Up to the onset of authorized interexchange competition at the beginning of this year, the overall cost-reducing incentives have been effective, in the sense that Pacific has reduced its prices in response to the productivity target (consumers have benefited) and that Pacific has reduced its costs accordingly.[15] While the adopted productivity factors may have seemed

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[12] UCLA forecasts an inflation rate of about three percent for the next five years. Therefore, the current productivity factor of five percent requires nominal prices to decrease two percent per year (3 - 5) and real prices to decline by five percent per year.

[13] If Pacific's changes in the cost per access line had matched the RBOC average over the course of the current regulatory plan (1990 - 1994), its costs would have been over seven percent higher than they actually are. At the same time, Pacific's growth in equity earnings has lagged the industry—Pacific's earnings growth has averaged 3.5 percent per year, while the industry (as measured by the Standard & Poor index) has enjoyed annual earnings growth of over six percent per year.

[14] Indeed, until January 1, 1995, 80 percent of Pacific's revenues were classified as monopoly services (Category I).

[15] Other outcomes from the incentive regulation plan have departed from competitive outcomes, namely the requirement that below-cost rates for exchange access be reduced annually by the uniform application of the

reasonable in 1989 at the outset of incentive regulation, they are too high for the environment California's LECs face today, mainly because the strong growth in high margin services that drove productivity gains in the 1980s will not occur under the competitive conditions of the last half of the 1990s.

Phase I of this investigation explores changes to the indexed price cap formula. Pacific proposes and our evaluation supports replacing the formula with the price protection that comes from the current requirement that the Commission must approve price changes to Category I services. In the event that the Commission chooses to modify, rather than replace the formula, we explain why the current target of five percent is unrealistic for the competitive environment prevailing in California today and why a target no larger than the historical differential of two percent is reasonable.

There have been two fundamental changes in California's telecommunications environment. The conditions at the beginning of incentive regulation were conducive to higher productivity growth. Telecommunications output growth in California greatly exceeded the national average. In contrast, California's output growth no longer is above average and Pacific has become a relatively low cost company. Therefore, although a high productivity target may have been sustainable in the early years of incentive regulation, it is no longer consistent with the current environment. Second, with the arrival and growth of competition, the emphasis must shift from the across-the-board price reductions built into the current plan to protecting targeted services such as basic access. Competition itself will provide the price protection and the concomitant efficiency incentives that the price cap plan has emulated. Specific changes include the following:

- Ensuring that price changes are, whenever possible, consistent with current economic and competitive conditions;[16]

- Removing the requirement that all prices be adjusted by a uniform amount, by providing regulatory safeguards only to those services that need it;

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price index and that toll prices remain well above cost. Consequently, current prices continue to sacrifice a considerable amount of economic efficiency.

[16] In particular, price protection should be concentrated on Category I (monopoly) services and should avoid reducing the prices of services that are already below cost.

- Ending the inefficient practice of reducing the prices of below-cost services.
- Allowing the marketplace to replace an unrealistic formula to determine a LEC's financial results.

A. Across-the-Board Application of the Price Cap Index in a Competitive Environment Can Cause Excessive Price Reductions

The necessary changes to incentive regulation are best understood by identifying the key features of the current plan. In general, a price cap plan can be viewed as a guarantee that *average* prices will be no higher than what an exogenous index will allow. Indeed, in our theoretical development of price caps, we demonstrated that the price cap index requires that the change in Pacific's revenue-weighted average price be no higher than the change in average economy-wide output prices (GDP-PI), less the productivity factor.[17] In competitive markets, this constraint is automatically met (on average).

The California price cap plan is a very specialized and extreme way to satisfy the average price constraint. Unlike other price cap plans, such as the federal plan adopted by the FCC, all prices must go down by at least the amount indicated by the index.[18] Therefore, when competition forces the LEC to price under the cap for services with downward pricing flexibility, revenues can fall short of costs, even if the firm is as efficient as the productivity target requires. That is, while *all* prices are reduced according to the formula, the prices subject to competition may be reduced even more, i.e., Pacific prices experience the double hit of the price cap index and competition itself. By definition, if some services have greater than average price reductions, meeting the average implies that other services have less than average price reductions. Otherwise, revenues go

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[17] William E. Taylor and Timothy J. Tardiff, "Pacific Bell's Performance Under the New Regulatory Framework: An Economic Evaluation of the First Three Years," April 7, 1993, Appendix 1. Both this reference and Dr. Christensen's testimony in this proceeding demonstrate that in theory, the productivity factor accounts for the expected difference in the rate of input price inflation between telecommunications and the overall economy. Dr. Christensen demonstrates that the expected difference in the rates of input price inflation is zero.

[18] A possible exception is when prices are below the cap in one year, the average reduction in following years may not exceed the amount specified by the productivity factor.

down by more than the cost reduction implied by meeting the target, and Pacific's financial health suffers in the process.

To take a simple example, suppose that before competition, the LEC receives revenues of $25 from basic service and $25 from toll and that these revenues cover cost (plus a normal return on investment). If the price cap formula called for a two percent price reduction at the end of the year, LEC revenues would fall by $1 (ignoring demand response effects), comprised of $0.50 (2% x $25) reductions for both basic and toll service. If, in addition, competition caused toll prices to decline by five percent during the year, toll revenues would fall by an additional $1.25 (5% x $25). However, if the price cap index were set correctly, LEC costs would have declined by only $1 (2% x $50), leaving revenues short of costs.[19]

B. The Current Plan Calls for Excessive Average Annual Price Reductions

The current five percent productivity target requires that Pacific's real average price decline by at least five percent per year. In contrast, the corresponding productivity gain for the U.S. industry has been 2.1 percent. The fundamental changes that have taken place in the industry make both the current target and the previous target of 4.5 percent excessively high on a going-forward basis. We also note that over the 1990 to 1995 period of California's incentive regulation, the LECs' prices have dropped by 25 percent in real dollars as a result of the compound impact of the annual productivity adjustments. In contrast, the long-term productivity differential of two percent per year implies a cumulative real price reduction of about 11 percent.

The following sections identify three factors that support replacing the current price cap formula with its productivity target of five percent with price protection for services where it is required. In particular, the price reductions required by the current formula are too large because (1) economic and telecommunications industry changes have reduced the likely future output growth rate, (2) toll price reductions have reduced the contribution of toll volume growth to

[19]Pacific's revenues are currently close to the $50 per line used in the example. Over 9.3 million residential lines, the $0.75 per line shortfall in this example translates into an annual revenue shortfall of $84 million.

productivity growth, and (3) toll market share losses will further reduce output growth, thus reducing expected productivity gains. These changes support the elimination of the price cap formula, because stable prices require that Pacific's productivity be as large as the inflation rate. In light of the changing economic and competitive conditions identified below, this level of performance is more realistic than that required by the current target, yet it is a productivity performance we expect will exceed that long-run national average of two percent. If, contrary to Pacific's recommendation, the Commission chooses to maintain a price index with a productivity target, a target no higher than the national average is reasonable.

In the six sections that follow, we analyze the components of a reasonable level of expected price changes. First, we agree with the Commission that industry-wide productivity, which has averaged two percent higher than productivity for the average firm in the economy, should be the starting point for determining reasonable productivity levels. In the three subsequent sections, we identify the factors in the California industry and economy that indicate that a deviation from the national average is not reasonable: (1) telecommunications output growth no longer exceeds the national average; (2) price reductions are eroding the contribution of toll services to productivity; and (3) competition in the toll market will further erode output growth. The last two sections argue that (1) the rate of national telecommunications productivity is not growing and (2) the California economy is unlikely to bounce back to the point where it will again be an engine for above-normal telecommunications output growth.

1. The Long-Term Difference Between Telecommunications and Economy-wide Productivity is Two Percent per Year

The long-run differential between the annual growth in telecommunications prices and average economy-wide prices is about two percent per year.[20] Coupled with expected inflation of at least three percent per year, the long-run differential would produce an annual *increase* in telecommunications prices, in contrast to the decrease produced by the current productivity target.

[20]Taylor and Tardiff, op. cit.

Hence, eliminating the price cap formula (which holds the prices of protected services constant) provides a reasonable degree of price protection.

The most recent research supporting this conclusion was performed by Dr. Christensen on U.S. LEC post-divestiture productivity.[21] And in light of the Commission's Finding that: "A differential productivity factor representing the telecommunications industry productivity in excess of economy-wide productivity continues to be a reasonable method of calculating the productivity factor,"[22] *the fact that the current productivity factor greatly exceeds the historical differential implies that the former factor is too high by a commensurate amount.* In turn, an excessive productivity factor is inconsistent with the Commission's intent to provide Pacific the opportunity to be financially healthy.[23]

2. Current California Economic and Industry Conditions Are Less Conducive to High Productivity Than Was The Case Before 1990

The productivity factor of five percent exceeds the historical differential by a substantial amount. This fact signifies that a substantial "stretch" is in effect for California. In fact, the "stretch" built into California's productivity target is much greater than "stretch" components in almost every other jurisdiction.[24] A possible rationale for a special California stretch is the fact that at the time incentive regulation was first adopted, the growth in California's telecommunications industry greatly exceeded the national average industry growth. From 1984 to 1989, the period immediately preceding the beginning of the current regulatory plan, Pacific's output averaged growth averaged 6.4 percent per year. In contrast, U.S. telecommunications output growth

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[21] Laurits R. Christensen, Telephone Industry Productivity Performance And Its Implications For the Pacific Bell Price Cap Formula (September 8, 1995).

[22] D.94-06-011, Finding of Fact 28.

[23] D.89-10-031, p. 174.

[24] Also unlike most other jurisdictions, the current California plan has been in effect for six years, requiring reductions in the average real price of about 25 percent. While annual improvements on the order of four to five percent can be achievable, sustaining this level of productivity year after year becomes very difficult.